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Immediate technical needs of the US leather industry

by Stephen H. Feairheller

Eastern Regional Research Centre, Agricultural Research, Science and Education Administration, US Dept. of Agriculture, Philadelphia.

Stephen Feairheller

THIS paper is based entirely on my observations of the leather manufacturing industry as it now exists in the United States. It is possible, and perhaps even likely, that some members of the industry will not agree with all that is said. However, in the past 12 to 15 months I have participated in international and national meetings on hides and skins, leather manufacturing science and technology conferences, as well as meetings of the related trade associations. In addition, I have had numerous discussions with people involved in all parts of this economic sector from cattlemen to shoe and garment manufacturers, even retailers; and I believe I have taken an objective view of the situation.

The United States leather manufacturing industry is essentially a cattlehide leather industry. Last year approximately 83% of the leather produced in this country was from cattlehides. Certainly, the current shortages and resultant high costs of cattlehides in this country have had a serious effect on the industry. This situation, which has been developing over the past several years, has become a serious problem over the past several months.

Not long ago, when cattlehides cost 30 cents a pound, they represented about half or slightly better than half the cost of manufacturing the leather. Labour, chemicals and overhead represented the remainder of the cost and contributed between 14 and 17% each of that remainder. With an increase in the cost of cattlehides to 90 cents per pound and an increase of the other contributing costs at the normal inflationary rate. the cost for the hides has reached 75% of the manufacturing cost of the leather. The other three contributing costs are less than 10% each. The cattlehide has become a raw material too valuable to be wasted in the way it has been traditionally. However, the problem, by itself, is surmountable.

Another major problem of the US tanning industry is that of pollution of the environment caused by the manufacturing wastes. The regulations proposed by the United States Environmental Protection Agency (USEPA) several years ago for the discharge of liquid wastes were set aside as a result of legal action taken by the Tanners' Council of America. The USEPA has now developed new proposed regulations, which will have been published by the time this article is being read.

The new proposals will be even more restrictive than were the earlier ones. They now propose to regulate not only factories that discharge directly to rivers and streams but also those that discharge to municipal treatment plants. The major reason behind this is the desire to prevent the accumulation of heavy metals in the treatment plant sludges. For the leather manufacturing industry, the metal, of course, is chromium. These sludges are being considered for use as fertiliser on agricultural lands.

In some cases, these newly proposed regulations will make it more economical for a factory to take the steps necessary to become a direct discharger than it will to remain an indirect discharger. They also severely restrict the amounts of sulphide and ammonia nitrogen that can be discharged, as well as the amounts of materials that have been specifically labelled as toxic substances. Phenols are an example of the latter.

A second environmental concern is that of the disposal of solid wastes, specifically those containing chromium from tanneries. Severe limitations are being placed on the disposal of these wastes, and the number of sites that will accept them is extremely limited. Also, the costs for disposal are increasing rapidly. Consideration is being given to incineration of the wastes with recovery of heat from the process and chromium from the ash.

A third environmental concern is that of exposure of the workers to harmful materials in the workplace. While most of the chemicals used in the manufacture of leather are relatively harmless and/or their use can be controlled in a safe fashion, it has been found that potentially harmful materials may be formed in the tannery.

A study last year by the National Institute of Occupational Safety and Health, an agency of the US Department of Health, Education and Welfare, detected the presence of relatively high levels of N-nitrosodimethylamine (NDMA) in the air of a US tannery. Although NDMA has not been shown to be carcinogenic to man, its carcinogenicity to a large number of other mammals is well established. An investigation by scientists from this Research Centre indicated that the major source of this material was formation in the air by reaction between a volatile chemical used as an unhairing agent and nitrosating agents formed as a result of combustion processes. Elimination of either of these reactants was found to be the best means of controlling this problem. Whether or not other problems like this will occur is unknown. However, more consideration must be given to the chemicals used and the way in which they are handled.

If, as I believe, these are the major problems facing the US tanning industry, then by implication the United States leathermaking technology must be adequate, since these problems are not related to leather quality. This is indeed the case. The US leather manufacturer, especially the cattlehide leather manufacturer, is capable of producing a wide variety of leathers of good to excellent quality for use in a variety of consumer products. Generally, progress in improving the leathermaking technology has been continual.

Incremental improvements

However, the changes that have been made would be described as incremental improvements in existing technology. Certainly, there have been no breakthroughs with completely innovative technology. So, while there is the need for longer-range research aimed at perhaps developing a totally new way of converting the hides into leather, the major and overwhelming need for research at this point is for programmes that are directed toward solutions of the peripheral problems discussed above. Indeed, these peripheral problems together could cause some of the factories to close.

Most of these problems—specifically hide costs, treatment of effluent streams, and solid waste disposal—dictate that

improvements must be made in the utilisation of the hide. It has been estimated that only 50% or less of the hide, as it is purchased by the tanner, is sold as leather. The implied amount of waste is not permissible in view of hide costs and waste disposal restrictions. Obviously, the efficiency of use of the hide material must be improved.

Some alternate uses for the hide material have already been developed or are being explored. These range from rather exotic biomedical applications to feed and fertiliser uses for recovered hair protein and processed hide scraps. It is essential that further developmental work along these lines be conducted and that the US tanners pay close attention to these developments and institute practices designed to obtain the ultimate utilisation of the hide material.

Early removal

Consideration should even be given to removal of those parts of the hide that are of inferior quality and lower the overall quality of the leather at an early stage in processing to prevent their conversion into leather. Studies dating back 15 years, and reinvestigated just this year, indicate that benefits would accrue to the tanner and the shoe manufacturer from such practices.

Lower quality hide trimmings and recovered hair protein should be considered for feed applications. One overriding requirement here, however, is that sufficient quantities of these materials be available for use. If not, it would be difficult to interest potential users in the material. This difficulty could, perhaps, be overcome by development of a standard tannery-produced animal feed supplement from these materials.

In addition to optimum hide material utilisation, optimum utilisation and minimum or zero discharge of some tanning chemicals must be achieved. Perhaps the most critical of these is the chrome-tanning salts. These materials are already being recovered and reused in the United States, a practice that will certainly be adopted by most tanners. In addition to this, however, serious attention must be paid to the improved fixation of chrome-tanning salts, thus preventing their exudation from chrome-tanned stock, since, in many cases, the amount currently exuded during further processing would exceed the discharge levels permissible under the newly proposed USEPA regulations.

Destruction of or recovery and reuse of sulphide will be essential: however, the methodology for doing this is already well established. Ammonia-nitrogen is a different problem. The levels proposed in the new regulations will be difficult to meet except by discontinuing the use of ammonium salts in deliming. Tanners who have tried to use other chemicals for this purpose have had problems with leather quality. Such problems need to be studied.

Other somewhat less important technical improvements that should be made are in the conservation of chemicals and energy in current drying and finishing practices. Newer methods of finish application and curing, such as ultraviolet and electron beam curing now used on other substrates, are being investigated for leather and may well find a place in leather manufacture. Alternative methods of drying that are more rapid and more energy efficient are being explored and could be adopted by the industry if proven to be applicable.

Finally, introduction on a substantial scale of a new leather-making raw material—the skin of the butcher hog—is being considered. Over 750 million square feet of these skins are potentially available. Obstacles to the conversion of the pork producing industry from its current practice to skinning must be overcome, and acceptance of the leather by the shoe manufacturer and the consumer must be accomplished. These are not technical requirements of the leather manufacturing industry, however, and that is the subject under discussion.

I have limited my discussion here to what I see as the immediate technical needs of the US tanning industry. These are certainly urgent and require further research and development effort toward developing answers to the problems. However, it is imperative that we continue the research directed toward the development of innovative technology. If this is not continued, then indeed the longer-range future will be bleaker than the near-range future looks right now.

Berry will retain Sawyer of Napa

SAWYER OF NAPA Inc will not be sold, Arne Kalm, chairman of Sawyer's board of directors, reported today in response to recent rumours that a change of ownership would occur. Berry Enterprises Inc, a diversified California company which acquired Sawyer in 1974, will retain ownership of Sawyer, a company that is recognised as the largest United States producer of high-quality shearling garments for both ladies and men.

Arne Kalm, who is also president of Berry Enterprises, affirmed the owners' confidence in the current management team and Sawyer's commitment to forging ahead as an international group in the world's significant shearling markets. Consistent with Sawyer's international goals, John Kolozs has been named to become president and chief executive officer of Sawyer International, in charge of all operations outside the United States.

Soccer shoe boom

ATHLETIC shoe marketers in the USA are entering the soccer shoe sector in a big way, both with new products and new advertising campaigns. There are an estimated 4m soccer players in the USA. The soccer segment is a new branch of the $1·13 billion athletic shoe industry building on the growth experienced by athletic shoe companies as a result of the jogging boom over the last five years.

from page 70

Blumenthal explained that skins are sold to tanners in two categories: 'garment size' which consists of grades three and four. The garment size are about 10 sq ft and currently sell for $4·25–4·50 per skin. As gelatine is only valued at about five cents per pound, ie: 55 cents per skin compared to the average 55 cents a sq ft raw ($4·25 per skin), it will pay the packers to produce quality pigskins for the tanners. Sow skins are valued at $5·5—6·0 per skin.

Large pork plants could produce 7 to 10 million sq ft skin per year when they are convinced that hot skinning is cheaper that scalding. The conversion to hot skinning will reduce the amount of energy and labour and produce a much more valuable product than gelatine or 'rind' on meats. So packers are assured of a return if they change away from scalding. Tanners should start at once to learn to process pigskins so that they are ready for this new raw stock when it comes on the market in volume. (Ref LEATHER March 1979 p 26.)

It is conceivable that a wet-blue pigskin market could be developed. Blumenthal envisages that a home market for leather from six-month-old pigskin will be specifically developed and that this may stretch to Europe, but not to the Far East. Japan was a major pigskin producer and one reason for the slow development of pig skinning in recent years has been the competition from cheaper Japanese skins in the Yugoslav market. Yugoslav tanners have been in the vanguard of pigskin tanning technology and their leathers have a world reputation. Their success underlines the importance of the development of special technology as a basis for confidence from both suppliers and manufacturers.